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Alberta TRANSPORTATION AND UTILITIES

TRANSPORTATION RESEARCH TRANSEARCH

AN AT&U TECHNOLOGY TRANSFER TECHNICAL PUBLICATION

SUPERPAVE™ the Road to the Future in Alberta

SUPERPAVE Mobile Laboratory at IRF Conference

By Ron Stoski, Transportation Lab

People who walked through the Federal Highway Administration (FHWA) mobile laboratory at the July 4-7, 1994 International Road Federation (IRF) conference in Calgary had the opportunity to see SUPERPAVE - the asphalt mix quality control standards of the future. SUPERPAVE Asphalt Mix Design and Field Management is a FWHA project which demonstrates the concept of using mix design properties for field quality control and innovation.

The mobile trailer contained SHRP asphalt test equipment (the rotational viscometer, dynamic shear rheometer, and SUPERPAVE gyratory compactor); theoretical maximum density equipment; computers; microwaves; and conventional quality control equipment. The new equipment was designed as part of the US$150 million Strategic Highway Research Program (SHRP). The asphalt portion of the research program questions the status quo of hot mix design procedures and has developed tests and equipment to ensure that the mixes produced meet performance-based designs and standards.

SUPERPAVE Mobile Laboratory is equipped with the latest technology in asphalt mix design and testing

New equipment is required because the current test methods used on hot paving mixes are simple tests which were designed with the technology available about fifty years ago. In their time, the test methods were adequate because they were able to predict the performance of aggregates, asphalt, and hot mixes used to build pavements under the conditions which existed then.

The time to design and build quality pavements for the year 2000 is now.

Many people are starting to realize that the testing methods and tools developed years ago may not adequately deal with today's paving problems. In the future, there will be a need to supply a quality product at a reasonable price to meet the demands of industry to increase truck loads, truck tire pressures, and traffic volumes.

Alberta's climate also requires that test methods are able to predict pavement distress related to fatigue cracking, low temperature cracking, and pavement deformation problems such as rutting.

During June 1994, the equipment in the FHWA trailer was used to test hot mix placed on Highway 2:22, north of the Olds interchange to south of Bowden. This type of "on the job" design, testing, quality control and field management of hot mix is a new concept to the United States and will help to ensure that mixes produced meet performance-based standards.

The time to design and build quality pavements to meet the demands of the year 2000 is now.

INSIDE - New TT Reps Appointed - See Page 8

About This Publication

The TRANSEARCH publication is prepared by the Research and Development Branch of Alberta Transportation and Utilities. The publication is dedicated to the effective transfer of transportation and utilities related research information and state-of-the-art technologies throughout the department. The opinions expressed in the articles in this publication are those of the authors and are not necessarily the official views of Alberta Transportation and Utilities.

In short news and feature articles, TRANSEARCH reports on the most interesting research and technologically significant events concerning the department.

In the interest of providing a vehicle for the effective transfer of technology throughout the department, Research and Development encourages department staff to provide proposals containing unique ideas, innovations or opportunities for research and evaluation which may provide solutions to the various technical needs of the department.

This publication is distributed throughout the department of Alberta Transportation and Utilities. Back issues are catalogued and retained in the department library. Copies of TRANSEARCH are also distributed to other Canadian D.O.T.s as well as Alberta Cities.

Comments and suggestions may be submitted to:

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EDITORIAL

Creating an Innovative Culture

The thrust of AT&U's new mission statement and key initiatives is based on change: changing the way government does business, changing the way we do our jobs. Some of these changes involve applying new technology and innovation, much of which occurs naturally in the every day tasks that many AT&U staff perform. However, change has not been fully accepted by all AT&U staff. One reason for this is the perception by some staff that taking risks is unacceptable and that creativity and ingenuity of line staff is not always encouraged.

Recently the staff of the Technology Transfer Section had the opportunity to travel around the province and talk to line staff from every district and head office. From the feedback collected, the main issue repeatedly raised was:

" ... there is a need to create a culture in the department where freedom to experiment can flourish. Credit should be given to all persons involved, especially those who show initiative. Failures that do occur should be looked upon as learning experiences. Senior management support for innovation does exist, but it needs to permeate to all levels in the department ..."

As editor of TRANSEARCH, I feel responsible to relay this information to you and share some thoughts on it. It suggests to me that all supervisors, not only managers, need to convey back to our staff that some justified, calculated risk-taking is acceptable in certain circumstances. Unless we do this, the present perception will continue.

An excerpt from the Regional Division Business Plan conveys a direction that might be considered for adoption by all of us in the department:

"Staff will be encouraged to be innovative and justified risk-taking will be supported. The objective will be the creation of a culture where innovation and risk-taking are the norm. The processes involved include:

- *encouraging managers (and supervisors) to enhance their skills with an emphasis on helping staff to discover solutions to opportunities on their own;*
- *encouraging staff to examine all possibilities and to take some risks;*
- *providing support to the development of a process to reward innovation and risk-taking."*

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CORRECTION

The April/94 issue of Transearch contained two errors. The article, "Wings That Make Snow Fly", was written by Ian Urvold, Equipment Supply and Services Branch and the Contract Database submitted for a Technical Innovation Award was developed by Clarence Dewald. Our apologies to Ian and Clarence and thanks to the people who brought this information to our attention.

SUPPORT TT!

Recommendations for Effective Technology Transfer

By Zach Zacharia, Research and Development

According to the Regional Division Business Plan, an increased emphasis will be placed on Technology Transfer (TT) this year. The committee that met to discuss carrying out this process came up with many recommendations including the following six:

1. Whenever staff start a new task, they should ask the following questions:
   a) Should we be doing this?
   b) Can we try something different?
   c) Is this the best way?
   d) Has this been tried before?
   e) Is anyone else doing it differently?

2. Innovation should become as ingrained in our culture as safety.

3. All offices should have a TT bulletin board where Technical Flashes, InfoSpon forms, award forms and research guidelines are all available. For research information the phone number for the Research and Development branch should be posted.

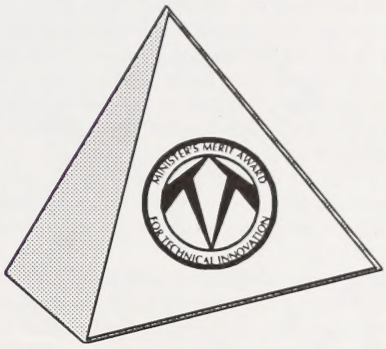
4. Have a small idea plaque that can be placed beside telephones and coffee machines with the following: Phone 422-2750 if you have a good idea, or need some help to get an idea developed or want to know if anyone else has tried it.

5. Each District Transportation Engineer should request those who attend the workshop to carry out at least two new ideas obtained from the workshop.

6. Set aside time for TT at district and regional meetings, at project manager and operation conferences, highlighting innovations, new products and new processes. Initiate annual regional meeting of technologists and maintenance staff together to support TT and team working.

CALL FOR NOMINATIONS

1995 Minister's Merit Award for Technical Innovation



The Minister's Merit Award was established to recognize employees of Alberta Transportation and Utilities who have, through their own ingenuity and design, created or adapted a product, technique or process, which is technical in nature and results in benefits to the department by improving the quality of a product/service and/or efficiency of function.

The 1995 Award will be presented at the 1995 AT&U Technology Transfer Workshop.

The deadline for nominations is October 1, 1994.

For more information contact: Ray Filipiak 422-2750

Mystery Districts Identified as Hotbed of Technology Transfer

By Zach Zacharia, Research and Development

A few districts have been going out of the way to encourage technology transfer (TT). In one district the foremen meet regularly to discuss innovation and new product development. Many of these innovations are submitted to our research database (InfoSpon). There are 16 products developed internally identified as an AT&U special product in InfoSpon.

Another district emphasizes the importance of always giving credit and recognition to the originators. Staff are encouraged to communicate directly with head office for information. Upper management support for innovation exists. The freedom to explore new ideas is also given to all staff. During foremen meetings, failures are discussed and used as a constructive learning process. TT agents, staff whose responsibility is to share innovation information, are found throughout the district.

Pockets of active Technology Transfer are found throughout the department. When will your area become identified as the TT hotbed?

In Search of Innovative Erosion Control Solutions

Ditch Erosion Control Using P300

By Alan Mah, Research and Development

Controlling erosion along highway ditches is an important concern for Ron Poch and his erosion control crew. Most ditches are protected from erosion using conventional hydroseeding techniques and the selective use of straw bale ditch blocks. Depending on ditch and flow characteristics, alternate erosion control measures may have to be used. One common alternative is woven erosion control mats constructed of natural or synthetic fibers. The purpose of these ditch mats is to hold the soil and seed in place while vegetation is allowed to develop. Over time, the mat slowly degrades and the vegetation acts as a permanent form of erosion control for the ditch.

In recent years, Alberta Transportation and Utilities has successfully used various commercial mats constructed of straw and/or coconut fibers. These mats prove to be effective under moderate flow conditions. In areas with higher or continuous water flow, a more durable mat such as P300 is recommended. P300 consists of 100% nylon fibers with UV

Ditch erosion control using P300

Observations from my Winter Vacation...

By Ivan Perich, Hanna District

While on vacation in the United States in January , I travelled on nearly 9000 kilometres of Interstate Highway and noticed a number of items that were of interest. They are as follows:

- **Guardrail snowfence**

  This snowfence is constructed to heights of 10 or 15 feet and sometimes higher. It appears that it is used to stop all snow from entering the highway system at specific locations. It is not used at all locations but seems to be erected where it can stay up on a permanent basis. I saw these types of snowfence in Montana, Colorado and Wyoming.

- **Rut patching**

  This rut patching is similar to the rut patching that was performed by District 3 using the Lee-Boy asphalt maintainer in 1993. In Wyoming and Montana, I saw kilometre after kilometre of rut patching. The road surface was relatively smooth and the patching costs would appear to be much less than a skin patch overlay of the entire travel lane for that situation.

- **Bars over culvert ends**

  In both Oklahoma and Kansas, the culvert ends had a grid of bars welded or placed over the top of them. I assume this was to permit vehicles to pass over the culvert ends without incident. In situations where we have guardrails to protect motorists from going over the culvert end, we should further investigate this type of protection. It may eliminate unnecessary guardrail and winter maintenance costs.

- **Shoulder grooves**

  On Interstate 25 in the Denver area, about every 50 to 100 feet, there were three to five transverse grooves on the shoulder to warn motorists that they were driving on the shoulder. This may be a method that could be used in some locations in Alberta if we wished to retro-fit shoulder rumble bars.

- **Shoulder rumble bars**

  In Montana, narrow strips of asphaltic concrete pavement were laid down in a fashion similar to the grooved rumble bars on Interstate 25 by Denver. It produced the same results as the grooving did.

- **"Give 'Em a Break" signs**

  These signs were set up to advise motorists that workers were actually working on the road surface. The intent of the signs is to warn motorists to be careful in their vicinity. These signs were observed in Wyoming, Colorado, Oklahoma and Kansas.

- **Cable guardrail installations**

  I noticed a significant amount of this guardrail placed throughout Montana. One particular location was on Interstate 15 approximately 10 miles south of Shelby, Montana and just south of the Marias River. I drove through Montana the night after a severe snow storm had occurred. Conventional guardrail had accumulations of packed snow on the road surface. The cable guardrail locations had no such accumulations of packed snow evident.

Our erosion control crews continue to look for cost-effective and innovative ways to meet our erosion control needs.

stabilized netting on both sides. Essentially, this mat performs the role of a permanent ditch liner.

To demonstrate P300, an eroding ditch location was selected along Highway 22:20 in the southern region. Previous attempts to seed the ditch were unsuccessful. In 1990, Ron Poch and his crew regraded this sandy/silty ditch and used P300 to line the ditch bottom. Straw fiber mats were used to line the back and side slopes. Wooden lath and 20-30 cm staples were used to hold the mats in place. After 3 years, vegetation is almost fully established, with no evidence of ditch erosion.

Our erosion control crews continue to look for cost-effective and innovative ways to meet our erosion control needs. For example, Ron Poch is now considering the use of "used tires" to stabilize a sliding backslope. Look for articles on this project in future issues of Transearch.

Hitch-Hiking on the Electronic Highway

By Ray Filipiak, Research and Development

I propose to the readers of Transearch that we expand the highway infrastructure to include the Information SuperHighway. The first step would be to hitch-hike onto the Internet by setting up a news-group dedicated to exchange of ideas and opinions on advancing technologies which have potential for application in the transportation industry. The objective is simple "Global Technology Transfer". A good test-arena could be the network of FHWA LTAP Technology Transfer Centres (as I understand, some are already exploring the possibilities of the information superhighway).

Some of the topics / subjects that come to mind because they are of specific interest to me are highlighted below. They are by no means exhaustive.

- *Tele-commuting as an alternate means of working*
- *Office Automation to clean up the paper overload*
- *Video Conferencing as an alternative to travel*
- *Multi-media applications for publishing and interactive staff training*
- *SHRP products evaluation results abstracts*
- *Virtual Reality applications such as tele-presence in potentially hazardous operations*
- *Public agencies and patenting / licensing of intellectual property developed in-house*
- *Others (ie. new materials, processes, equipment, etc.)*

As another example of information sharing, the Research and Development branch has a database (InfoSpon) on current and recent research, research documents and product evaluations performed by Alberta Transportation and Utilities. Our intent is to eventually have InfoSpon accessible on-line via modem or .... maybe the Internet might be an appropriate medium for others to access this information. Wouldn't it be great if every agency had such an information database on the Internet? Anyone with an Internet access to the news group could get in on this information exchange.

I am somewhat new to Internet and not completely familiar with all the possibilities and limitations, but I do think there are many possibilities. I also know the Internet is a stepping stone to the telecommunications revolution that will engulf us all in the next few years. I would entertain any thoughts on this topic ... please respond via my Internet address filipr@censsw.gov.ab.ca or through more conventional media.

Nylon Tape Protects Fence and Wildlife from Injury

By Randy Blacker, Lethbridge District

During a recent visit to British Columbia, I noticed several fences parallel to the highway were marked with a yellow and black woven nylon tape.

This tape was fastened to the top wire of the fence and was continuous for many kilometres with intermittent breaks for gates, entrances, and road allowances.

The intent of this nylon tape is to make wildlife aware of the location of the top of the fence. This enables the wildlife to jump over the fence without damaging the fence or causing injuring themselves.

A spokesperson for B.C. Highways informed us that they are responsible for fence maintenance adjacent to primary highways. Since the inception of this practice, fence maintenance costs have been greatly reduced.

Although the land owner or leasee is responsible for fence maintenance within our Province, it may still be desirable to examine the use of this product in areas that are fenced for grazing purposes and have significant wildlife movements. This work could be included with initial fence construction or land owners could be encouraged to use it where there has been a problem in the past.

Possible benefits are: less fence maintenance; reduced livestock intrusion on roadway; and reduced injuries to wildlife.

Nylon tape is fastened to the top wire of fence

PLAN FOR IT!

February 2-3, 1995

Open to all AT&U staff who are interested in attending or participating. As well, our municipal partners and friends in other provinces and the United States are welcome to attend.

If you have an idea, innovation, operational problem, new technology or any information that could possibly help others in their job, you are of special interest to us. We are currently soliciting for presentations.

To properly prepare for the workshop, start planning now.

The location for the workshop will be Edmonton. (details to be announced at a later date)

For more information, contact your Technology Transfer Representative or the Research and Development branch at (403)422-2750.

C-SHRP Follow-on Program Kicks into High Gear

On April 1, 1994 the C-SHRP follow-on program kicked into high gear. At approximately $2 million over five years, it is more modest than the $6 million C-SHRP program, but equally important. Research which is not implemented into daily operations does not have much benefit, so $0.8 million has been allotted for the implementation of C-SHRP/SHRP results and $1.2 million for the continuation of the long term pavement performance (LTPP).

The program is funded through annual contributions by the ten provinces, the two territories and Transport Canada. The program is overseen and directed by a new Executive Committee with representation from each sponsor. Our departmental representative is Jan Konarzewski from Research and Development, who is also the provincial coordinator for this program.

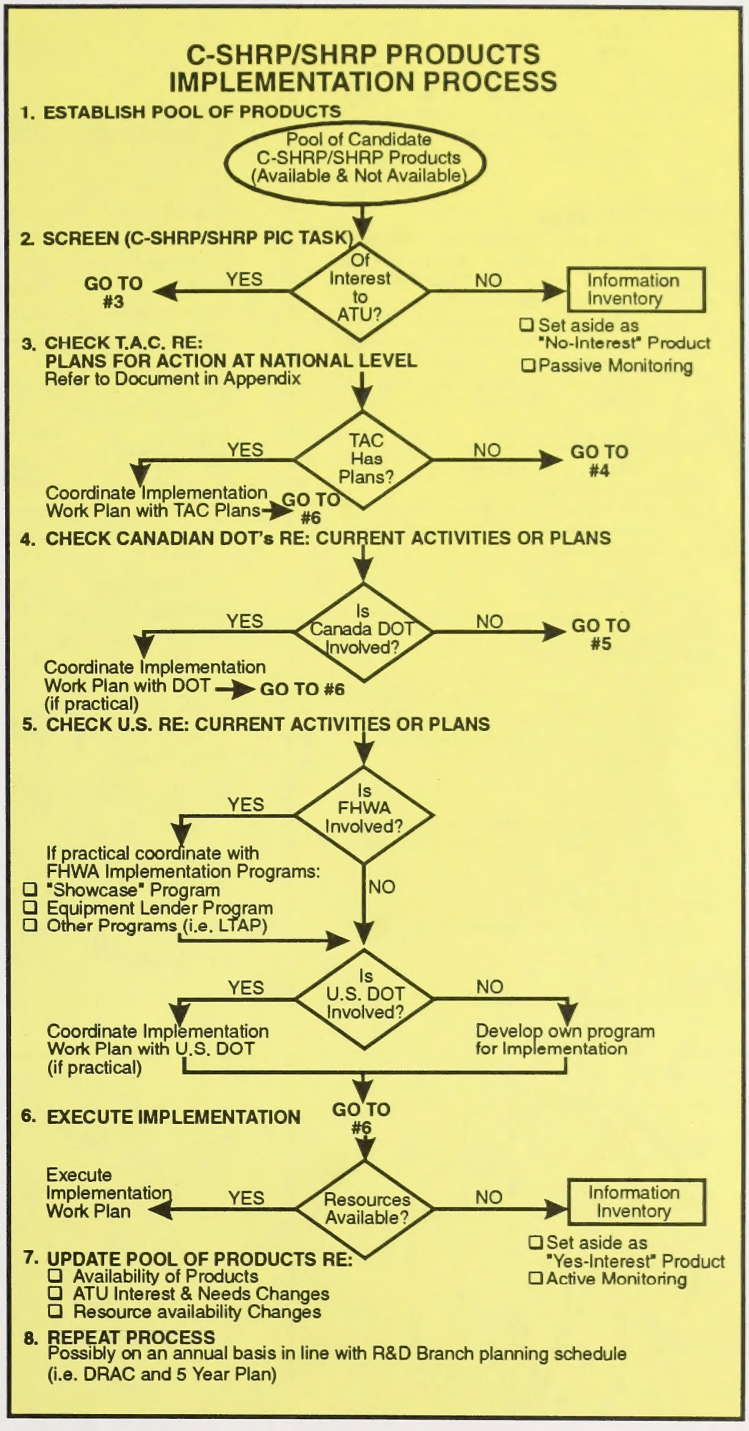
The implementation of research results is being handled in a two pronged approach. Locally, Ray Filipiak of Research and Development is responsible for having the emanating products (some 140 of them) screened by departmental staff and if found suitable, start the implementation process.

Concurrently, C-SHRP is coordinating and delivering the transfer and implementation of results at the national level. These two processes mesh with each other to ensure they are complementary and there is no duplication. Last year, seminars were delivered on some of the results of the structures program. Also, in July at the IRF Conference in Calgary, sessions were presented on some aspects of results from the structures, asphalts and highway operations programs and on C-LTPP. Coming this fall, a series of seminars across the country on highway operations results is planned.

Both the Canadian and American LTPP programs are continuing for at least another five years. We have test sites for both in Alberta. The program is being overseen and directed by the new LTPP Steering Committee, of which Richard Orrell of Roadway Engineering is a member. Day to day activities in the monitoring of test sections and reporting of results are coordinated by Helen Tetteh-Wayoe and Alan Mah of Research and Development. This past May, seminars were held, including Edmonton, on the development of pavement performance prediction models for rutting, cracking and roughness using the Baysian statistical approach of including prior knowledge.

Hands-on training in the use of the software was carried out in June of this year.

As these two aspects of the C-SHRP continuation program develop, we will keep you up to date on their progress through this publication.



Publications

ABTR/RD/RR-94/02
Title: Soil Bioengineering Demo Project in Alberta
Author: Helen Tetteh-Wayoe, P.Eng.
Brief: This report summarizes the results of a research project aimed at demonstrating the use of soil bioengineering methods for erosion control and bank protection in Alberta.

ABTR/RD/RR-94/03
Title: Study to Investigate the use of Recycled Tire Rubber in Asphalt Concrete (Vol. I & II)
Proj. Coordinator: Helen Tetteh-Wayoe, P.Eng.
Brief: This study was conducted to determine the feasibility of incorporating rubber crumb produced from used tires into conventional dense graded hot mix asphalt pavements. The two volume report include the results of a literature review and laboratory test program.

ABTR/RD/RR-94/04
Title: Timber Pile Maintenance
Author: Robert Mossing
Brief: Different methods of bridge timber pile maintenance are discussed together with estimated cost.

ABTR/RD/RR-94/06
Title: Petrographic Analysis Assessing Aggregate Quality
Author: Alan Mah, P.Eng.
Brief: The objective of this report is to review and improve the department's current standard for assessing aggregate quality. The project focuses on concrete aggregates used in bridge construction

ABTR/RD/RR-94/07
Title: Test Program to Approve Paint Systems for use on Steel Highway Bridges and other Structures
Proj. Coordinator: Marcel Chichak, P.Eng.
Brief: A new paint testing and approval process is developed for replacement of the present alkyd system.

Alberta Transportation & Utilities Technology Transfer Representatives

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Jane Stoeck	REB/Materials Engineering	427-3101	7-3101
Doug Dahl	REB/Traffic Engineering	422-4219	2-4219
Fred Bowker	Municipal Services Branch	422-4591	2-4591
Ken Danchuk	Operations Branch	422-2147	2-2147
Harry Parenteau	Equip. Sup. & Services	427-8310	7-8310
Daniel Munroe	Information Services	427-8690	7-8690
Ray Booth	Motor Transport Services	427-8901	7-8901
Paul Bassi	Roadway Planning	427-7073	7-7073
Peter Kilburn	Technical Services, Planning	427-6720	7-6720
Diane Smith	Library/Record Services	427-8802/0040	7-8802/0040
Jack Phelps	Policy & Strategic Planning	427-7944	7-7944
Jack Stonehouse	Sub District (Medicine Hat)	529-3640	184-3640
Randy Blacker	District 2 (Lethbridge)	381-5480	181-5480
Ivan Perich	District 3 (Hanna)	854-5550	165-5550
Fred Lee	District 4 (Calgary)	297-7677	161-6311
Ed Spetter	District 6 (Red Deer)	340-5200	151-5200
John Matwychuk	District 7 (Stony Plain)	963-5711	---
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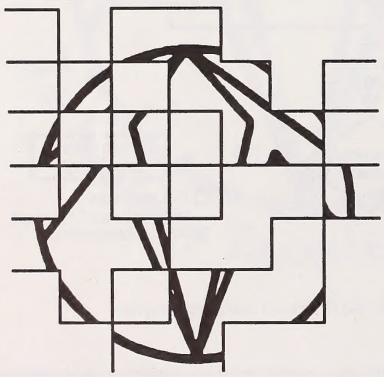
Howard Peterson	District 9 (Athabasca)	675-2624	---
Gerry Pyper	District 10 (Vermilion)	853-8178	141-8178
Sal Augruso	District 11 (Lac La Biche)	623-5474	137-5256
Nabil Razkalla	R&D & Sub District (High Prairie)	523-6620	122-6620
Darrell Caplin	District 13 (Grande Prairie)	538-5310	121-5310
Kp Smith	District 14 (Peace River)	624-6130	120-6130
Terry Hood	Sub District (High Level)	926-2241	---

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